

Applicant: KURT *et al.*
Serial No: 10/671,864
Filing Date: September 29, 2003
Page: 6 of 13

REMARKS

In response to the final Office Action mailed December 18, 2006 (hereinafter "Office Action"), claims 1, 2, 6, 8, 10, 14, 19 and 20 have been amended without any intention of narrowing the scope of any of the claims and indeed broaden the claims. Claims 1-2 and 4-20 are pending. In view of the following comments, reconsideration and allowance of all the claims pending in the application is respectfully requested.

Entry of the Amendment is proper under 37 C.F.R. §1.116 as the amendments: (a) place the application in condition for allowance for the reasons discussed herein; (b) do not present any new issues that would require further consideration and/or search as the amendments merely amplify issues discussed throughout the prosecution; (c) do not present any additional claims without canceling a corresponding number of claims; and (d) place the application in better form for appeal, should an appeal be necessary. Entry of the Amendment is thus respectfully requested along with withdrawal of the final Office Action.

INFORMATION DISCLOSURE STATEMENT

Applicant thanks the Examiner for considering the references cited in the Information Disclosure Statement filed on November 14, 2006, as evidenced by the signed and initialed copy of the PTO-1449 Form returned with the Office Action.

REJECTIONS UNDER 35 U.S.C. §103

Claims 1-2, 4-6, 8 and 10-20 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent No. 6,225,032 to Hasegawa *et al.* ("Hasegawa") in view of "In Situ Cleaning of GaN/6H-SiC Substrates in NH₃", Journal of Crystal Growth 222 (2001), pgs. 452-458 to McGinnis *et al.* ("McGinnis"). [Office Action, pg. 2, ¶2]. Applicant respectfully traverses this rejection for *at least* the reason that a *prima facie* case of obviousness has not been established.

Claims 1-2, 4-6, 8 and 10-20 are patentable for *at least* the reasons that: (1) the Office Action relies on non-analogous references for the rejection; (2) assuming arguendo that Hasegawa and McGinnis are not deemed non-analogous, Hasegawa, McGinnis, or any proper combination thereof do not disclose, teach or suggest each and every feature of the claims;

Applicant: KURT *et al.*
Serial No: 10/671,864
Filing Date: September 29, 2003
Page: 7 of 13

and (3) assuming arguendo that Hasegawa and McGinnis are not deemed non-analogous, there is no legally proper teaching, suggestion, or motivation to modify Hasegawa to include the teachings of McGinnis.

1. The Office Action's reliance on Hasegawa with McGinnis is improper as these references are non-analogous references to Applicant's claimed invention.

a. Hasegawa is non-analogous

A two step test has been developed to determine whether a particular reference is within the appropriate scope of the prior art. First, it must be determined whether a particular reference is "within the field of the inventor's endeavor." Second, assuming the reference is outside that field, it must be determined whether the reference is "reasonably pertinent to the particular problem with which the inventor was involved." *In re Deminski*, 796 F.2d 436, 230 U.S.P.Q. (BNA) 313, 315 (Fed. Cir. 1986).

The Office Action has not established that Hasegawa is an analogous reference. The inventor's field of endeavor relates to providing a lithographic projection apparatus with in-situ control of molecular contamination (for example, radiation-induced carbon contamination, which causes the formation of films on optical elements), by utilizing a composition including one or more perhalogenated C₁-C₆ alkanes; and one or more compounds including one or more nitrogen atoms and one or more atoms selected from hydrogen, oxygen and halogen. *See* Specification, e.g., pgs. 3-4, paragraphs [0009] and [0012] and pgs. 10-11, paragraphs [0041]-[0043].

Hasegawa states that its field of endeavor relates to a method and apparatus for manufacturing liquid jet heads whereby to manufacture a resin ceiling plate by means of grooving, drilling, or the like by the irradiation of laser beam. *See* Hasegawa, e.g., col. 1, lines 9-13. This is clearly a very different field of endeavor.

Since Hasegawa is outside the present inventors' field of endeavor, the inquiry becomes whether this reference is reasonably pertinent to the particular problem(s) with which the present inventors were involved. It is not. The present inventors' problem relates to efficiently and selectively removing contamination, such as hydrocarbons, in a lithographic

Applicant: KURT *et al.*
Serial No: 10/671,864
Filing Date: September 29, 2003
Page: 8 of 13

apparatus, desirably without causing damage to, for example, EUV mirror surfaces and using a material with low light absorption such that the introduction of such material into the optical train has little or no adverse effect on transmissivity.

Hasegawa is concerned with the problem of providing a water-repellent layer on the resin surface on a liquid jet head. *See Hasegawa, e.g., col. 2, lines 48-67.* These are very different problems with very different solutions.

The Office Action has not established that a person having ordinary skill in the art would reasonably have been expected to solve the problem of removing contamination, such as hydrocarbons, in a lithographic apparatus, by considering the solution in Hasegawa to Hasegawa's problem of providing a water-repellent layer on a resin surface on a liquid jet head. The final Office Action is devoid of any evidence to support this position.

b. McGinnis is non-analogous

In addition, the Office Action has not established that McGinnis is an analogous reference. McGinnis states that its field of endeavor relates to a metalorganic chemical vapor deposition-grown GaN on 6H-SiC substrates. *See McGinnis, e.g., page 1.* This is a very different field of endeavor than the present inventors' field.

Since McGinnis is outside the present inventors' field of endeavor, the inquiry becomes whether this reference is reasonably pertinent to the particular problem(s) with which the present inventors were involved. It is not. As discussed above, the present inventors' problem relates to efficiently and selectively removing contamination, such as hydrocarbons, in a lithographic apparatus, desirably without causing damage to, for example, EUV mirror surfaces and using a material with low light absorption such that the introduction of such materials into the optical train has little or no adverse effect on transmissivity.

McGinnis is concerned with the problem of contamination of a substrate surface prior to GaN homoepitaxy growth using molecular beam epitaxy. *See, McGinnis e.g., pg. 452.* These are very different problems with very different solutions.

The Office Action has not established that a person having ordinary skill in the art would reasonably have been expected to solve the problem of removing contamination, such as hydrocarbons, in a lithographic apparatus, by considering the solution in McGinnis to

Applicant: KURT *et al.*
Serial No: 10/671,864
Filing Date: September 29, 2003
Page: 9 of 13

McGinnis' problem of contamination of a substrate surface prior to GaN homoepitaxy growth using molecular beam epitaxy . The final Office Action is devoid of any evidence to support this position.

2. The cited portions of Hasegawa, McGinnis or any proper combination thereof do not disclose, teach or suggest the claims.

Even assuming arguendo that Hasegawa and McGinnis are not deemed non-analogous, the cited portions of Hasegawa, McGinnis, or any proper combination thereof do not disclose, teach or suggest each and every feature of the claims.

For example, Applicant submits that the cited portions of Hasegawa, McGinnis, and any proper combination thereof, do not disclose, teach or suggest a lithographic projection apparatus comprising, *inter alia*, a space in the apparatus comprises a composition to remove a contaminant from a surface of the apparatus, the composition containing (a) and (b), wherein (a) is one or more perhalogenated C₁-C₆ alkanes and (b) is one or more compounds including one or more nitrogen atoms and one or more atoms selected from hydrogen, oxygen and halogen as recited in claim 1.

The Office Action cites the abstract, col. 3, lines 60-67, col. 4, lines 1-67, col. 5, lines 58-67, col. 6, lines 12-67, col. 7, lines 1-13 and 38-67, col. 8, lines 1-24, col. 11, lines 10-39 and 64-67 and col. 12, lines 1-19 of Hasegawa as disclosing, teaching or suggesting claim 1 except for the composition containing one or more nitrogen atoms (for which McGinnis is relied on). [Office Action, page 2]. Respectfully, Applicant disagrees.

As discussed above, Hasegawa discloses a method and apparatus for manufacturing liquid jet heads and for providing a water-repellent layer on the resin surface on a liquid jet head. In particular, Hasegawa states that:

Now, however, when drilling is made by a technique of the kind for the formation of discharge ports, the byproducts that are created at the time of laser processing and allowed to adhere to the processing surface of the ceiling plate. Then, the surface energy per hour becomes higher on the portions where the byproducts have adhered, and the resultant wettability becomes higher with respect to the recording liquid. In other words, such surface becomes hydrophilic.

Applicant: KURT *et al.*
Serial No: 10/671,864
Filing Date: September 29, 2003
Page: 10 of 13

In order to enhance the discharge efficiency of the recording liquid at its discharge ports of a liquid jet head, it is desirable to make them water-repellent in order to avoid any stronger interaction between liquid and resin.

Hasegawa, col. 2, lines 40-51. To make the byproducts water-repellent, Hasegawa discloses exposing the byproducts to a fluorine atmosphere to make the byproducts water repellent. In this regard, Hasegawa discloses:

It is then attempted to fluorinate the surface of the byproducts. In this way, the chemical modification is performed on the surface of the byproducts that causes the surface energy to rise when adhering to the blank. The surface of the byproducts are thus fluorinated so as to suppress the phenomenon that may bring about the local hydrophilicity on the surface of the discharge port plate due to the adhesion of the byproducts. At the same time, this method enables the water-repellency of the related surface to be enhanced more than the conventional art.

Thus, the cited portions of Hasegawa do not disclose, teach or suggest a composition to remove a contaminant (e.g., the byproducts - "there is no need for the provision of any special processes in order to remove the byproducts" Hasegawa, col. 14, lines 40-41) but rather merely teaches applying a fluorine atmosphere to make the byproducts water-repellent. Indeed, the process of Hasegawa adds material, rather than removing a contaminant. Moreover, the cited portions of Hasegawa fail to provide any disclosure, teaching or suggestion regarding a composition including one or more nitrogen atoms.

Therefore, Applicant submits it is clear that the cited portions of Hasegawa fail to disclose, teach or suggest a composition to remove a contaminant from a surface of the apparatus, the composition containing (a) and (b), wherein (a) is one or more perhalogenated C₁-C₆ alkanes and (b) is one or more compounds including one or more nitrogen atoms and one or more atoms selected from hydrogen, oxygen and halogen.

Further, the cited portions of McGinnis fail to overcome the deficiencies of Hasegawa. The cited portions of McGinnis fail to provide any disclosure, teaching or suggestion regarding a lithographic apparatus. Moreover, the cited portions of McGinnis fail to provide any disclosure, teaching or suggestion regarding a composition to remove a contaminant from a surface of a lithographic apparatus, the composition containing one or more perhalogenated C₁-C₆ alkanes. Rather, the cited portions of McGinnis merely provide

Applicant: KURT *et al.*
Serial No: 10/671,864
Filing Date: September 29, 2003
Page: 11 of 13

disclosure of ammonia cleaning and annealing for metalorganic chemical vapor deposition-grown GaN on 6H-SiC substrates.

Therefore, the cited portions of Hasegawa, McGinnis, and any proper combination thereof, fail to disclose, teach or suggest claim 1. Further, claim 19 recites similar aspects as claim 1 and is allowable for similar reasons as discussed above with respect to claim 1.

3. There is no legally proper teaching, suggestion, or motivation to modify Hasegawa to include the teachings of McGinnis.

Even assuming arguendo that Hasegawa and McGinnis are not deemed non-analogous, there is no proper teaching, suggestion, or motivation to modify Hasegawa to include the teachings of McGinnis. The Office Action alleges that McGinnis, on pages 452-453, discloses that an ammonia flux is introduced into a plasma atmosphere. [Office Action, page 3, ¶3]. The Office Action then alleges that it would have been obvious to modify Hasegawa by introducing the plasma atmosphere with ammonia because McGinnis discloses that the ammonia flux introduced into the plasma beam resulted in the inhibition of surface roughening and produced a relatively smooth substrate surface. [Office Action, page 3, ¶4].

As discussed above, McGinnis describes metalorganic chemical vapor deposition-grown GaN on 6H-SiC substrates, which is cleaned by annealing the substrate in an ammonia flux. It is not clear that McGinnis discloses introducing an ammonia flux into a plasma atmosphere. Pages 452-453 of McGinnis appear only to discuss plasma in the context of prior studies by others, not in terms of their work. Indeed, McGinnis teaches away from plasma by stating that “prolonged nitrogen plasma exposure...causes surface damage” McGinnis, pg. 452.

Moreover, there is no reasoned basis, teaching or suggestion that McGinnis’ ammonia flux would have a similar effect on the liquid jet recording heads of Hasegawa. Indeed, Hasegawa is not at all concerned with cleaning a contaminant, unlike McGinnis. Further, the environments of McGinnis and Hasegawa are completely dissimilar – McGinnis relating to metalorganic chemical vapor deposition while Hasegawa relating to a method and apparatus for manufacturing liquid jet heads whereby to manufacture a resin ceiling plate by means of

Applicant: KURT *et al.*
Serial No: 10/671,864
Filing Date: September 29, 2003
Page: 12 of 13

grooving, drilling, or the like by the irradiation of laser beam. Indeed, McGinnis and Hasegawa have little if anything in common with each other and a person skilled in the art certainly wouldn't look to either of these references to modify the other and the Office Action has provided no reasoned basis to explain why a person skilled in the art would look to McGinnis to modify Hasegawa.

For at least the reasons set forth above, a *prima facie* case of obviousness under 35 U.S.C. §103 for claims 1 and 19 has not been established. Claims 2, 4-6, 8 and 10-18 are patentable at least by virtue of their dependency from claim 1, and for the additional features recited therein. Claim 20 depends from claim 19 and is allowable by virtue of its dependency from claim 19, and for the additional features recited therein. Accordingly, the rejection of claims 1-2, 4-6, 8 and 10-20 should be withdrawn.

Claim 7 stands rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Hasegawa in view of McGinnis and in further view of U.S. Patent No. 5,320,707 to Kanekiyo *et al.* ("Kanekiyo"). [Office Action, pg. 4, ¶6]. Applicant respectfully traverses this rejection for at least the reason that a *prima facie* case of obviousness has not been established.

Claim 7 depends from and claims additional features of claim 1. Since the cited portions of Hasegawa and McGinnis do not disclose, teach or suggest claim 1 and the cited portions of Kanekiyo do not remedy the defects of Hasegawa and McGinnis with respect to claim 1, dependent claim 7 is allowable by virtue of its dependence from an allowable base claim, and for the additional features it recites.

Claim 9 stands rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Hasegawa in view of McGinnis and in further view of U.S. Patent No. 6,252,648 to Hase *et al.* ("Hase"). [Office Action, pg. 4, ¶1]. Applicant respectfully traverses this rejection for at least the reason that a *prima facie* case of obviousness has not been established.

Claim 9 depends from and claims additional features of claim 1. Since the cited portions of Hasegawa and McGinnis do not disclose, teach or suggest claim 1 and the cited portions of Hase do not remedy the defects of Hasegawa and McGinnis with respect to claim

Applicant: KURT *et al.*
Serial No: 10/671,864
Filing Date: September 29, 2003
Page: 13 of 13

1, dependent claim 9 is allowable by virtue of its dependence from an allowable base claim, and for the additional features it recites.

CONCLUSION

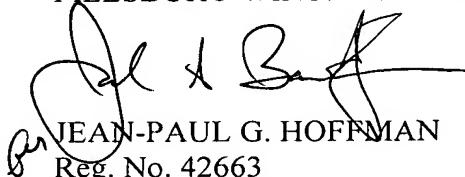
Having addressed each of the foregoing rejections, it is respectfully submitted that a full and complete response has been made to the outstanding Office Action and, as such, the application is in condition for allowance. Notice to that effect is respectfully requested.

If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Date: March 15, 2007

Respectfully submitted,

PILLSBURY WINTHROP SHAW PITTMAN LLP

 Reg. 37,087
JEAN-PAUL G. HOFFMAN
Reg. No. 42663
Tel. No. 703.770.7794
Fax No. 703.770.7901

JPH/CMT
P.O. Box 10500
McLean, VA 22102
(703) 770-7900